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110 -001

Ritter® by MIDMARK

Power Examination Table

Service and Parts Manual

FOR USE BY MIDMARK
TRAINED TECHNICIANS ONLY

Part No. 003-0050-00 Rev. E (1/01/04)

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Section I

GENERAL OPERATION AND CARE OF EQUIPMENT

Introduction

This section covers complete instructions for the installation, operation, and normal care of I E Industries Model 110, TREND II, Power Medical Examination Table.

The Model 110, TREND II, table has been designed to help reduce effort and work fatigue involved in the examination of an ever-increasing number of patients during the doctor's normal working day.

The height of the table, the angle of the table top, and the upper section of the table top are easily adjusted by the use of an electric-hydraulic power unit. Height of the table can be adjusted from 25" to 42". The angle of the table top may be varied from horizontal to 45" and the upper portion of the table top can be adjusted from horizontal to a full chair position. The combination of these three motions provide a table which can not only be tailored to meet the individual doctor's requirements, but will meet the requirements of most examinations being performed in the doctor's office today.

All adjustments are controlled by a foot control switch, leaving both hands free while adjustments are being made.

Unpacking and Installation

Unpacking: When unpacking the table, to keep from damaging the upholstered top or wooden side panels, do not use a knife or other sharp object to open the packaging. When moving the table, lift only at points "A" shown in Fig. 1. **(Note:** Table is bolted to wooden shipping skid at each corner of the base.)

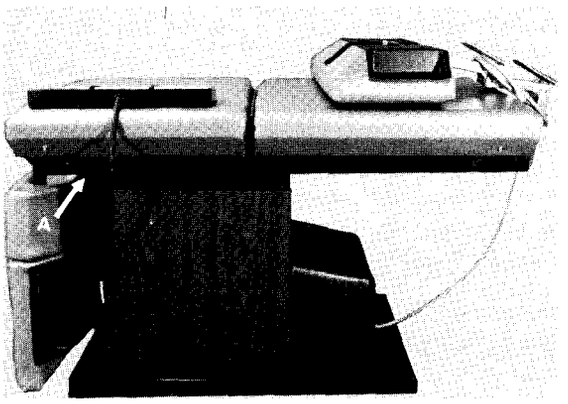

Fig. 1

Leveling: A leveling screw pad is located under each corner of the table base. By proper adjustment of these leveling pads a level, solid installation can be obtained on uneven floors.

Electrical: The Model 110 table must be used only with 115 Volt-60 Cycle Alternating Current.

The three-pronged grounding plug on the table cord must be inserted into a matching three-pronged, grounded, 115-Volt receptacle. This single table cord provides power for both the electrical hydraulic power unit and the 115 Volt electrical outlets located on each side of the table.

If a three-pronged grounding receptacle is not available, an adaptor may be obtained from a local electrical supply house. When an adaptor is used, be sure that it is installed properly in accordance with local electrical codes.

CAUTION

1. Use 115 Volt-60 Cycle Alternating Current Only.
2. Allow table to reach room temperature before operating.
3. As with any electrical equipment, do not use this table in an explosive or oxygen-enriched atmosphere.

Operation of Table Power Features

Adjustment of Table Height: To raise table depress the left side of the pedal marked "TABLE". By lifting your foot from the control pedal, the table will stop and lock itself automatically at the height it has reached. Table stops automatically when it reaches its maximum and minimum height positions.

To lower the table, depress the right side of the "TABLE" pedal and hold down until the table reaches desired height.

Do not hold the control pedal down after the table has reached the extreme low or extreme high position. Operation of the table for an extended period of time at either of these positions will overheat the motor.

Adjustment of Table Top Angle: To tilt the table top, depress the right side of the pedal marked "TILT". By removing the foot from the control pedal, the table top will stop and lock itself automatically at the angle it has reached.

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To bring the table top back into the horizontal position, depress the left side of the "TILT" pedal and hold it down until its desired position is obtained.

The table top stops automatically when it reaches its full horizontal or full tilt position.

Do not hold control pedal down after either of the extreme positions has been reached. Extended operation of the motor at either of these positions will overheat the motor.

Adjustment of Upper Table Top Section: To raise the upper portion of the table top from horizontal to chair position depress the right side of the foot pedal marked "HEAD". By removing the foot from the control pedal, the section will stop and lock itself automatically at the position it has reached.

To lower the section depress the left side of the "HEAD" pedal and hold it down until the desired position is obtained.

Section stops automatically when it reaches its full horizontal or full chair back position.

Do not hold control pedal down after either of the extreme positions has been reached. Extended operation of the motor at either of these positions will overheat the motor.

Leg Rest Support: To lower leg rest support from the horizontal position lift one of the levers marked "A" in Fig. 2. This releases the lock and allows the foot rest support to be lowered to any angle between horizontal and vertical.

To lift the support to horizontal position it is necessary only to lift at point B, Fig. 2.

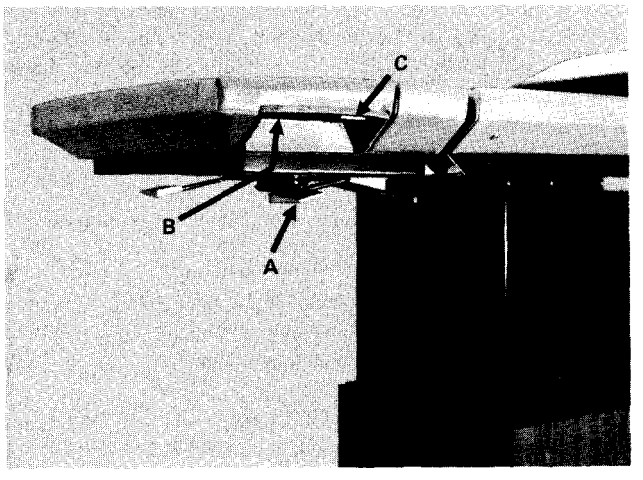

Fig. 2

Proctrol Knee Rest Support: To place the proctol knee rest into the position shown in Fig. 3, depress lever C, Fig. 2, on each side of the knee rest cushion. This releases the locking mechanism and allows removal of the knee rest pad from the table by pulling toward you.

The knee rest pad can then be inserted in one of the three locating slots (Item A) as shown in Fig. 3.

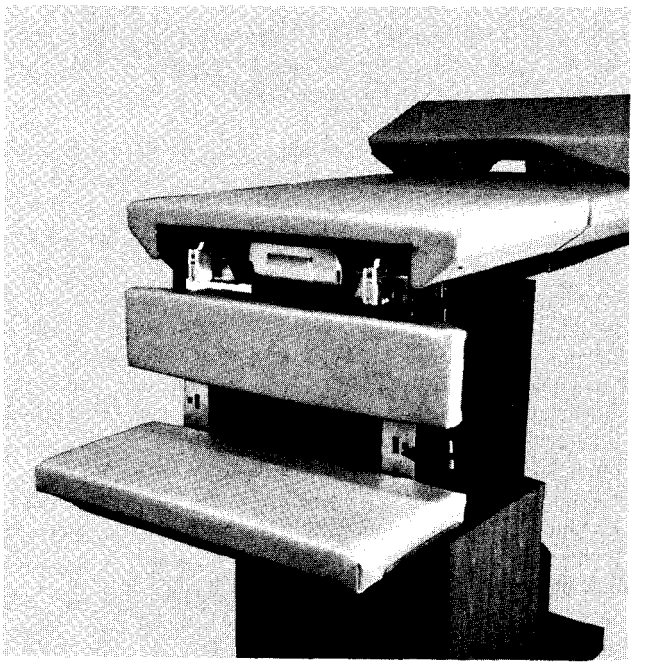

Fig. 3

When inserting the pad into the knee rest position the metal guides should be inserted into the slots until you hear the mechanical locking device engage.

Stirrup Adjustment: To adjust stirrup assembly, grasp end of complete assembly and slide straight out of table to full extension. Unfold stirrup to an erect position.

To change lengths, the stirrup slides easily on the stirrup bar while the stirrup bar remains fully extended and locked in a lateral position.

To adjust width, or lateral position, of stirrups, slide stirrup bar into table approximately 1/2". This releases the lateral locking mechanism and complete assembly is free to swing laterally. Move complete assembly to one of the three positions in Fig. 4. When in this position slide stirrup assembly back out to full extension to lock securely.

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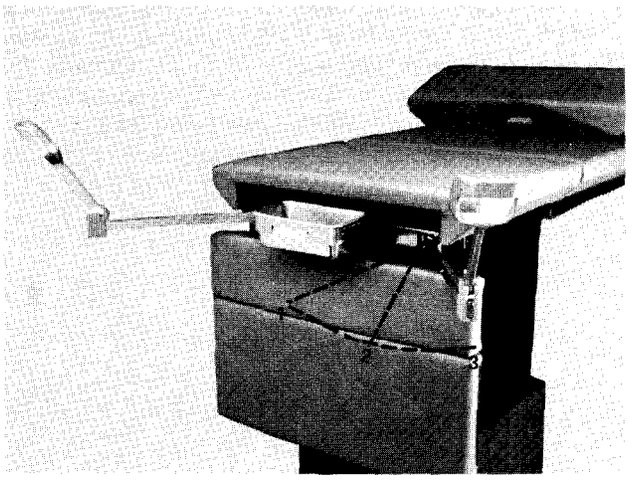

Fig. 4

This range of width adjustment combined with the length adjustment will accommodate most patients allowing easy examination by physician.

To store stirrups after use, return stirrups to position No. 1, fold stirrup down against bar and slide complete assembly into table.

Irrigation Pan Location: Stainless steel irrigation pan is located between the stirrups as shown in Fig. 4. The pan extends easily from the table on its own set of runner tracks. Pan stops automatically when it is extended to its full position.

Care of Table

Care of Upholstery: The upholstery material used to cover the top of the Model 110 table is resistant to most medicinal-type stains, but may be damaged by solvents and dyes. Regular care should be maintained by daily wiping with a damp cloth or sponge and periodic cleaning with a mild soap and water solution.

Any fluid spilled on the upholstery should be removed as quickly as possible.

In the case of stain, it is best to first try to remove it with soap and water. If this fails, then a stronger means such as rubbing alcohol or cleaning fluid should be tried. Whenever a cleaning fluid is used, try it first in an inconspicuous area to be sure it will have no adverse effects on the upholstery.

Care of Painted Metal Surfaces: All painted metal surfaces should be wiped with a clean, soft cloth weekly and periodic applications of paste wax made to all surfaces to preserve the finished luster.

Care of Bright Metal Surfaces: All unpainted metal surfaces should be wiped weekly with a clean, damp cloth. Moving parts, such as stirrups and foot rest extension assembly, can be lubricated with Vaseline petroleum jelly or other light white lubricant. Lubrication will allow free movement of sliding parts and reduce posssibility of noise.

Care of Wood Surfaces: All wood surfaces should be wiped with a clean, soft cloth with periodic applications of paste wax to preserve surface luster.

Care of Moving Parts: All moving parts such as the tilt pivot pins, back hinge, foot extension pivots and footlock should be oiled occasionally with light machine oil to insure quiet dependable operation.

Headlock Adjustment

To adjust the holding action of the headlock, release the lock handle and loosen the lock screw Item A, Fig. 5 & 6 using a 3/32" allen wrench. With a 3/16" allen wrench tighten the adjusting screw Item B, Fig. 5 & 6 to obtain the greatest possible holding power without making the handle operation too difficult. Then with the handle in locked position, tighten the lock screw.

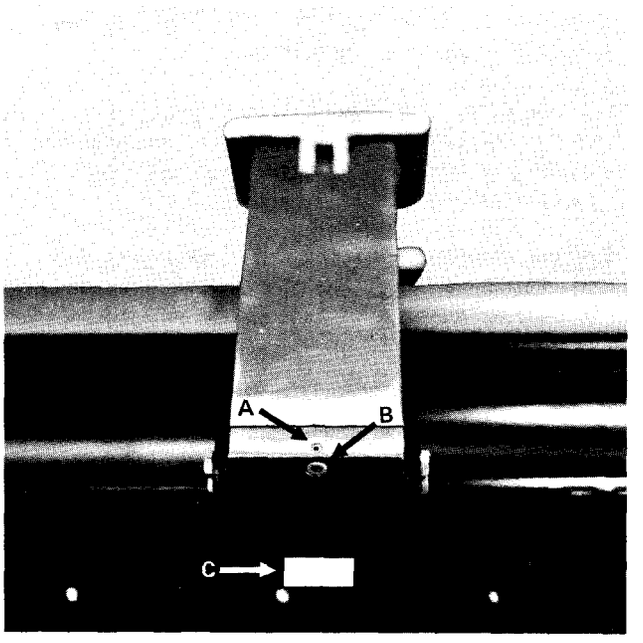

Fig. 5

Note: Light oil on the pivot points of the handle will help to a great degree the ease of operation of the handle.

In some rare cases, it may be necessary to adjust the handle stop to insure good holding power with ease of handle operation or to prevent the handle from springing loose under shock loads.

For proper action the handle stop must be adjusted so that when the handle is pushed down for locking action, the handle reaches a point where it wants to lock itself by suddenly going over center. The proper position of the stop is **just** a fraction over center. The stop is adjusted by loosening the lock nut Item C, Fig. 6 and turning the set screw stop Item D, Fig. 6 with a 1/8" allen wrench. After adjustment, lock the stop screw with the lock nut.

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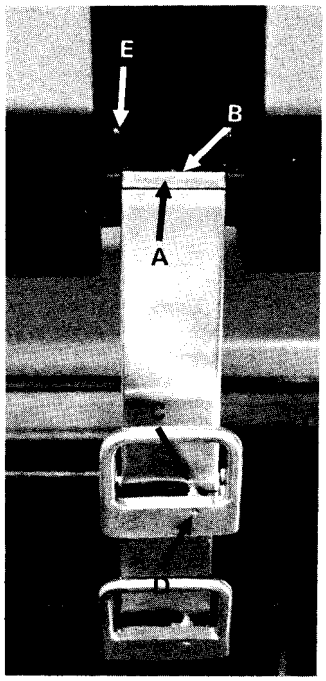

Fig. 6

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Removal of Headrest Upholstery Section

1) Remove the (4) screws which mount the headrest to the brackets of the headlock. (Item E, Fig. 6.)

Replacement of Headrest Upholstery Section

1) Install the (4) #10-24 x 1-1/4" screws through the metal brackets of the headlock and into the headrest. Tighten screws semi tight.

2) Align headrest square with back section and tighten screws securely.

Removal of Back Upholstery Section

1) Remove the metal panel from the metal back frame by removing (4) small screws. (Item A, Fig. 7.)

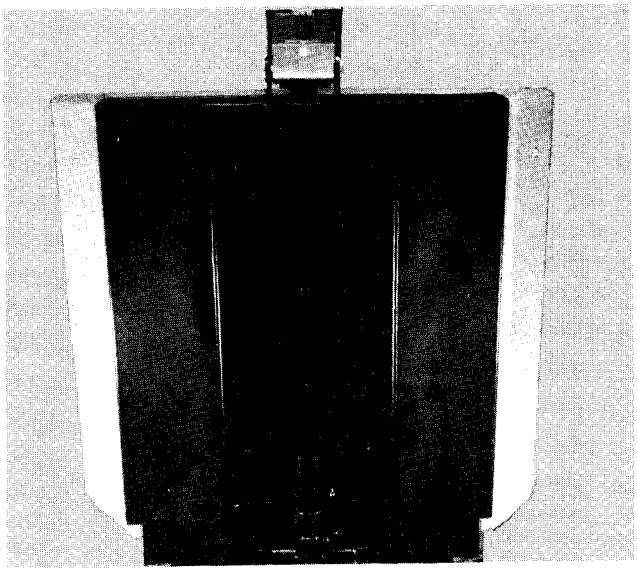

Fig. 7

2) Remove the (4) screws located inside the recessed area of the metal back frame. (Item A, Fig. 8.)

3) Lift the upholstered section off the back frame.

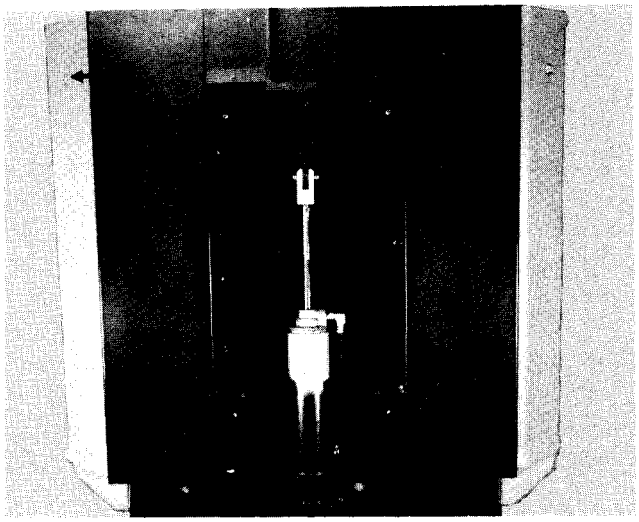

Fig. 8

Replacement of Back Upholstery Section

1) Place upholstered back section on the back frame with the tear strip snaps Item B, Fig. 8 toward the headrest and align mounting holes.

2) Install (4) #10-24 x 5/8" screws through the back frame and the upholstered section. Draw screws up tightly.

3) Install metal panel on the metal frame with (4) #6-32 x 1/4" screws.

Removal of Upholstered Seat Section

1) Remove the (2) screws located at the front edge under the metal frame above the stirrups. (Item A, Fig. 9.) It is easiest to do this with the leg extension raised up.

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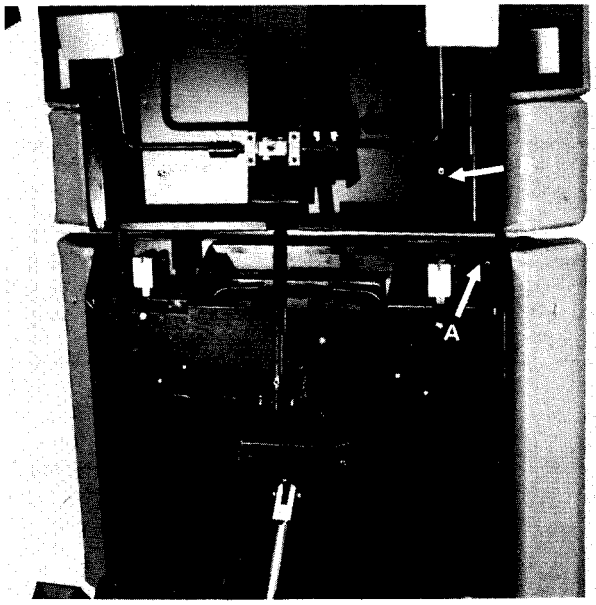

Fig. 9

2) Grasp the seat section at the front sides and pull towards the leg extension approximately 1 inch to disengage the holding clips, then lift off.

Replacement of Seat Upholstered Section

1) Place seat section on seat frame with metal clips toward the slots inside the seat frame. Push down firmly on seat and slide seat section toward slots to engage clips.

2) Align front holes and install (2) #10-24 x 5/8" screws. It is easiest to do this with leg extension raised up.

Removal of Leg Rest Upholstered Section

1) Lift leg extension up and remove the (2) screws located under the leg extension frame. (Item B, Fig. 9.)

2) Lift off leg rest upholstered section.

Replacement of Leg Rest Upholstered Section

1) With leg rest extension raised up, place leg rest upholstered section on the leg rest frame with the larger distance to the holes under the leg rest section toward the foot end.

2) Align holes and install (2) #10-24 x 1-3/4" screws under the leg rest frame.

Procedure for Removing and Exchanging Table Panels

1) Raise table to highest position.

2) Remove motor cover, rear outer shroud (motor end) and front outer shroud (stirrup end). See Shroud Removal Page 9.

3) Remove the panel shroud by removing the 3 screws located on the bottom flange. (Item A, Fig. 10.)

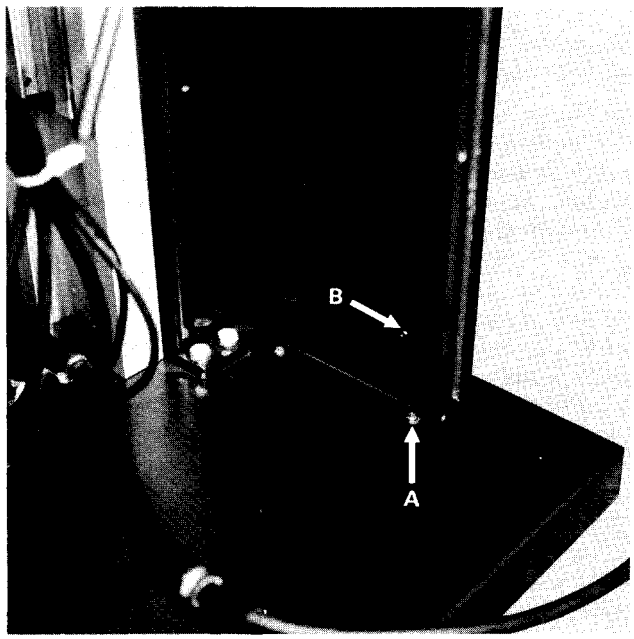

Fig. 10

4) The panel can be removed from the metal shroud by removing the 4 wood screws. (Item B, Fig. 10.)

5) Replace the new panel on the metal shroud with 4 wood screws.

6) Replace the panel shroud to the table base using (3) #10-3/8" screws.

7) Replace outer shroud (motor end), plastic motor cover, and outer shroud (stirrup end).

Note : When replacing motor cover, be sure power cord fits into slot and be sure all wires are inside cover.

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Section II

MAINTENANCE AND SERVICE OF POWER SYSTEM

Power System Operation

The power system consists of three basic sub assemblies:

1. An electric motor coupled to a hydraulic pump with a reversing solenoid valve and attached oil reservoir.

2. Three hydraulic cylinders with built-in electric solenoid valves.

3. A foot control footswitch assembly.

When the control switch, either Head Up, Tilt Down or Base Up is depressed, it opens a solenoid valve in the cylinder and simultaneously energizes the motor which pumps oil from the reservoir into the bottom of the respective cylinder. This extends the pistons of the cylinder to the desired length. When the control switch is released, the motor stops and the solenoid valve closes automatically locking the cylinder piston in that position. When the control switch, either Head Down, Tilt Up or Base Down is depressed, the solenoid valve is again opened and simultaneously the motor and a reversing solenoid valve energizes. Oil is then pumped from the reservoir into the top of the cylinder and retracts the piston to desired length.

The solenoid valves are built into the cylinders, eliminating the high pressure condition in the hoses when the motor is not running. This feature reduces the number of components subjected to high pressure and greatly minimizes the possibility of leaks or loss of hydraulic fluid in case of damage to the lines.

Power System Maintenance

The motor, pump, and reservoir are enclosed in a sound-deadened plastic housing which is located on the base plate. All moving parts, with the exception of the motor, operate in oil within a sealed system. No routine maintenance is required other than an occasional inspection of hose lines and electrical cords to make sure they are free of cuts or damage and clear of moving parts.

Power System Repair Procedures

The model 110 examination table has been designed so that all mechanical components can easily be repaired and/or replaced in the field if they should become defective for any reason.

If a part replacement should be required, the part should be ordered direct from the I E factory. When any part is ordered, a complete description or part number of the part required, along with serial number and date of installation of the table, must be supplied. For details of the exchange plan, please write the plant. (For location of serial number plate, see Item C, Fig. 5.)

Experience has shown that most service problems are due to minor troubles in the electrical circuits or control switches. Therefore, when testing inoperative units, always test switches and electrical wiring first. A defective switch, damaged cords, loose wall plug, or a blown fuse in the building circuit could be at fault.

Power System Specifications

Motor: General Electric, 1/2 Horsepower, Intermittant Duty, Capacitor Start & Run, 1500 R.P.M., 667 Watts, 5.8 Amps, 115 V.A.C., **60** Cycles.

Capacitor: 64-77 M.F.D., 330 V.A.C.

Pump Output: 3/4 G.P.M. @ 1500 R.P.M.

Internal Relief Valve: Set at 550-600 P.S.I. for cylinder extension.

External Relief Valve: Set at 200-220 P.S.I. for cylinder retraction.

External Flow Control: Variable flow for cylinder retraction free flow for cylinder extension.

Reservoir Fluid Capacity: 1-1/4 Pts. (2-1/2 Cups)

Total System Fluid Capacity: 3-1/2 Pts. including hoses, cylinders and reservoir.

Minimum Fluid Required: 1/4 Pt. required in reservoir with all cylinders retracted to maintain operation.

Hydraulic Fluid: **Light Grade** mineral oil.

Down Solenoid: .16 Amp, 18 Watt 115 V.A.C. 50/60 Cycles

Anticavitation Solenoid: 600 P.S.I. Holding pressure .14 Amp, 12 Watt, 120 V.A.C. 50/60 Cycles

Relay: 25 Amp Rating .4 Amp Current Draw, 16 Watt. 120 V.A.C. 60 Cycles

Micro Switch: 10 Amp Rating

Hose Rating: 2400 P.S.I. Burst 600 P.S.I. Working Pressure

Cylinder Rating: 800-1000 P.S.I. Burst Pressure, 600 P.S.I. Working Pressure, .38 Amp, 115 V.A.C.60 Cycle

Time Delay Relay: 1 Amp. Rating 3 Watt, 115 V.A.C. 50/60 Cycles.

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Motor Cover and Base Shroud Removal

Motor Cover

Remove motor cover by removing 6 screws. Item A, Fig. 11 and pulling bottom of cover out until top of cover disengages from retaining channel. **Note:** When replacing motor cover be sure all wires are inside of cover.

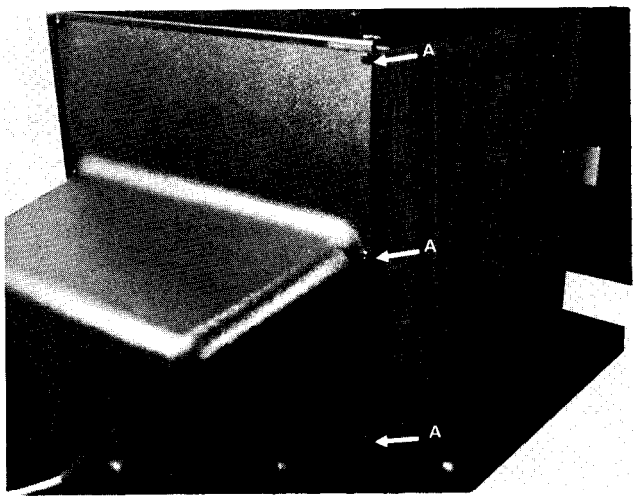

Fig. 11

Rear Outer Shroud
(Motor End)

Remove rear outer shroud by removing 4 small screws. (Item A, Fig. 12.)

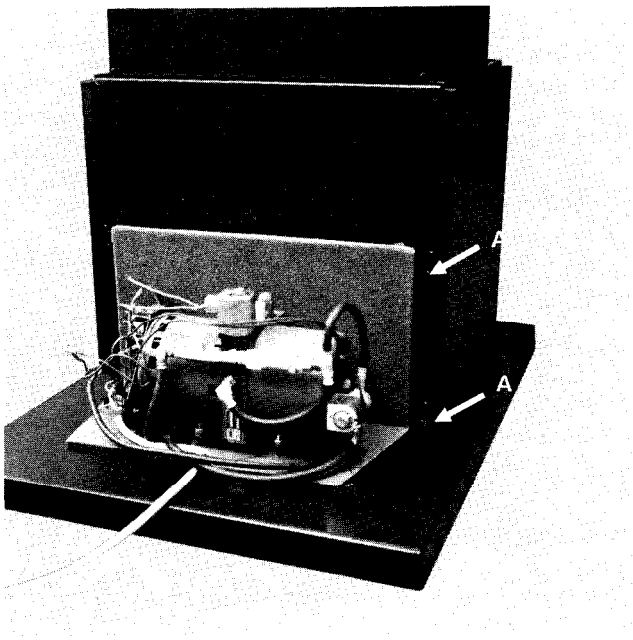

Fig. 12

Rear Inner Shroud
(Motor End)

Remove rear inner shroud by removing 8 small screws. (Item A, Fig. 13.)

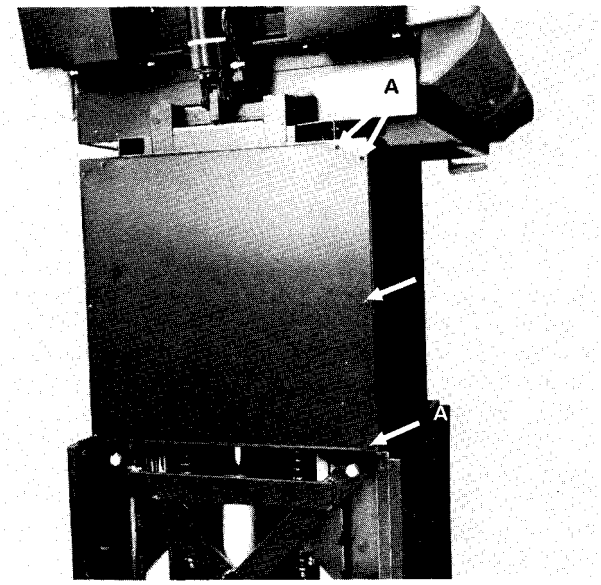

Fig. 13

Front Outer Shroud
(Stirrup End)

Remove front outer shroud by removing 6 small screws. (Item A, Fig. 14.)

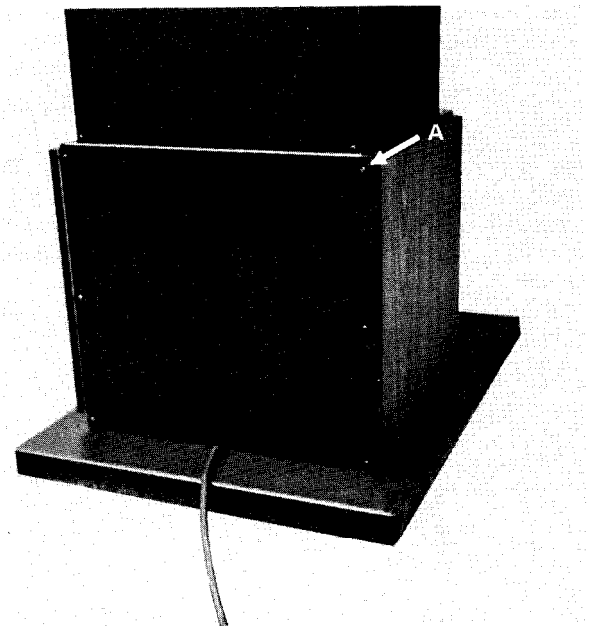

Fig. 14

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Front Inner Shroud
(Stirrup End)

Remove front inner shroud by removing 8 small screws, (Item B, Fig. 15) and 4 larger screws (Item A, Fig. 15.)

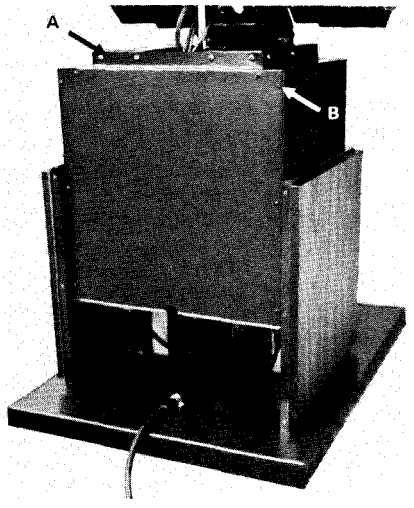

Fig. 15

Procedure for Replacing Back Raising Cylinder

1) When changing a cylinder, notice how the wires, hose fittings and nylon ties are positioned so they may be replaced exactly the same way. See Figs. 16, 17 & 18.

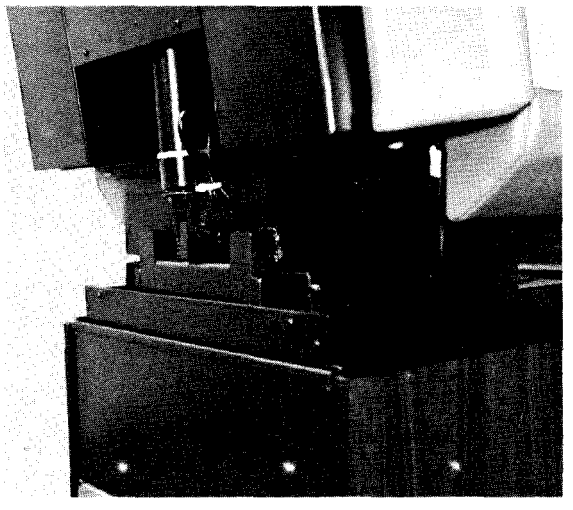

Fig. 16

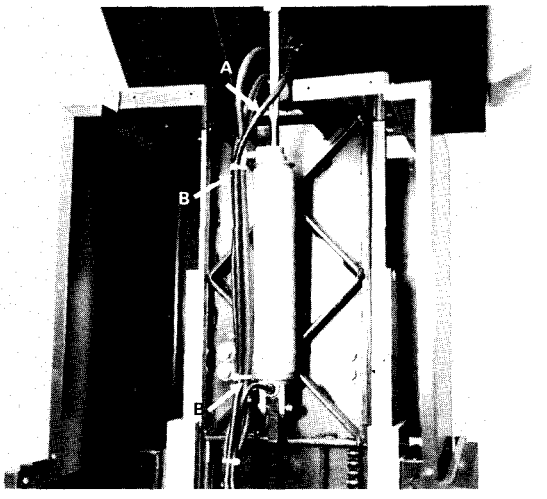

Fig. 17

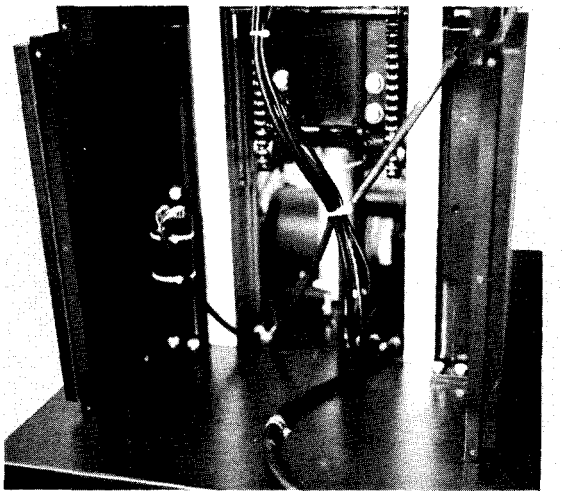

Fig. 18

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2) Remove motor cover, front outer shroud (stirrup end) and front inner shroud (stirrup end). See Shroud Removal, Page 9.

3) Remove cover on back of back section by removing 4 small screws. (Item A, Fig. 19.)

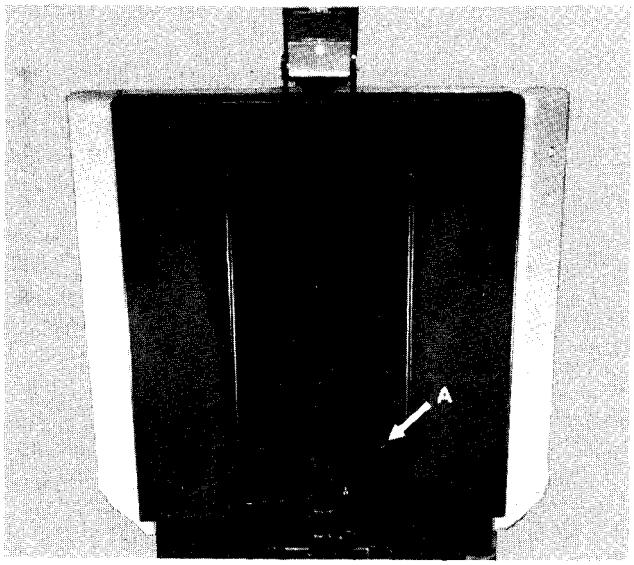

Fig. 19

4) Remove "E" ring and clevis pin from rod end of cylinder. Lay back section against seat section and let cylinder hang down. (Fig. 20.)

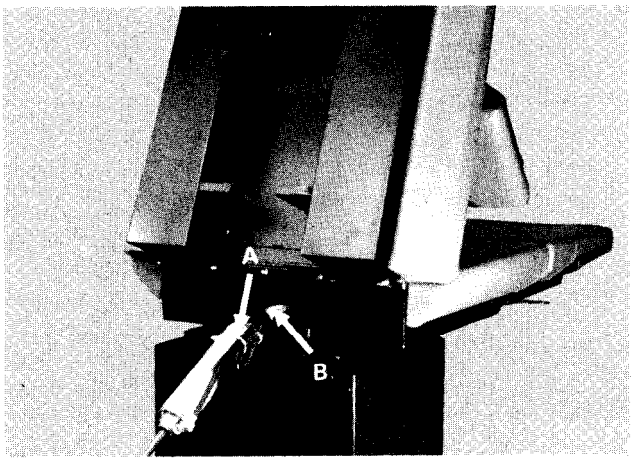

Fig. 20

5) Remove large nylon tie (Item A, Fig. 20) from cylinder. (**Note:** Replacement ties are included in cylinder replacement kit.)

8) Unwrap protective plastic covering from hose bundle. (Item B, Fig. 20.)

9) Remove hose fittings from cylinder with 1/2" wrench.

10) Cut wire off at least 6" from the defective cylinder. **Note:** Be sure power cord is disconnected from wall outlet.

11) Remove "E' ring and clevis pin from base end of cylinder to remove cylinder from table.

12) Install new cylinder by inserting clevis pin and "E" ring in base end of cylinder.

13) Connect hose fittings tightly to new cylinder and push cord inside slot and lay next to hoses.

14) Install large nylon tie to cylinder. (Item A, Fig. 20.)

15) Replace protective plastic covering to hose bundle. (Item B, Fig. 20.)

16) Follow defective cylinder cord from cylinder to terminal board at power pack and notice the nylon ties and clamps.

17) Lay new cylinder cord along side of defective cylinder cord and replace ties and clamps while removing defective cylinder cord and replacing new cylinder cord.

Note: It is important that all ties and clamps are replaced in exactly the same spot on the hoses, particularly the tie that attaches the spring. See Figs. 16, 17 & 18.

18) Remove defective cylinder cord from terminal board replacing terminals of new cylinder cord, black for black and white for white. Be sure power cord is disconnected from wall outlet.

19) Connect power cord and run back raising cylinder rod all the way out.

20) Connect rod end of cylinder with clevis pin and "E" ring.

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21) Run table back all the way down. Table should be level as shown in Fig. 21. If the back section sags down then adjust clevis out. If the back section tilts upward, then adjust clevis in. This is done by using the wrenching flats on the cylinder rod next to the clevis with a 3/8" open end wrench. The rod will turn easiest when it is extended to about half of total extension.

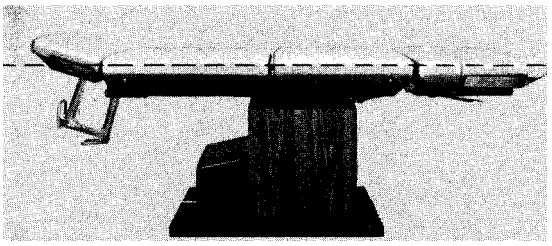

Fig. 21

22) If leakage of hydraulic fluid was excessive, after repair oil must be added to the system. Oil should be added as noted "Adding Oil to System", Page 16.

23) After assembly, check to see that all cords and hoses work freely and are free of obstructions.

24) Replace shrouds and motor cover and back cover. **Note:** When replacing motor cover, be sure power cord fits into slot and all wires are inside motor cover.

Procedure for Replacing Tilt Cylinder

1) When changing a cylinder, notice how the wires, hose fittings and nylon ties are positioned so they may be replaced in exactly the same way. (See Figs. 17 & 1 8 .)

2) Remove front outer shroud (stirrup end), front inner shroud (stirrup end) and plastic motor cover. See Shroud Removal, Page 9.

3) Remove "E" ring and clevis pin from rod end of defective cylinder. **Note:** Place a weight, approximately 50#, on seat section to be sure table top does not flip backwards.

4) Remove fittings from defective cylinder with 1/2" wrench. **Note:** Nylon ties (Item B, Fig. 17) must not be removed from cord and hose assembly.

5) Remove "E" ring and clevis pin from bottom of defective cylinder to remove cylinder from table.

6) Install new cylinder. Replace clevis pins and "E" rings and connect hose fittings tightly. **Note:** Cord A, Fig. 17, must be in position shown in Fig. 17, after cylinder is installed.

7) Follow defective cylinder cord from cylinder to terminal board at power pack and notice the nylon ties and clamps.

8) Lay new cylinder cord along side of defective cylinder cord and replace ties and clamps while removing defective cylinder cord and replacing new cylinder cord. **Note:** Replacement ties are included in cylinder replacement kit.

Note: It is important that all ties and clamps are replaced in exactly the same spot on the hoses, particularly the tie that attaches the spring. (See Fig. 17 & 18.)

9) Remove defective cylinder cord from terminal board replacing terminals of new cylinder cord, black for black and white for white. Be sure power cord is disconnected from wall outlet.

10) Connect power cord and run table tilt all the way down. Table should be level as shown in Fig. 21. If table is not level, the cylinder rod must be adjusted. This is done by using the wrenching flats on the cylinder rod next to the clevis using a 3/8" open end wrench. The rod will turn easiest when it is extended about half of its total extension.

11) If leakage of hydraulic fluid was excessive after repair, oil must be added to the system. Oil should be added as noted "Adding Oil to System", Page 16.

12) After assembly, check to see that all cords and hoses work freely and are free of obstructions.

13) Replace shrouds and motor cover. **Note:** When replacing motor cover be sure power cord fits into slot and all wires are inside motor cover.

Procedure for Replacement of Base Cylmder

Note: This operation requires two (2) men.

1) Remove plastic motor cover, rear outer shroud (motor end), rear inner shroud (motor end), front inner shroud (stirrup end) and front outer shroud (stirrup end). See Shroud Removal Page 9.

2) Remove "X" brace by removing 4 bolts (Item A, Fig. 22) with 9/16" wrench.

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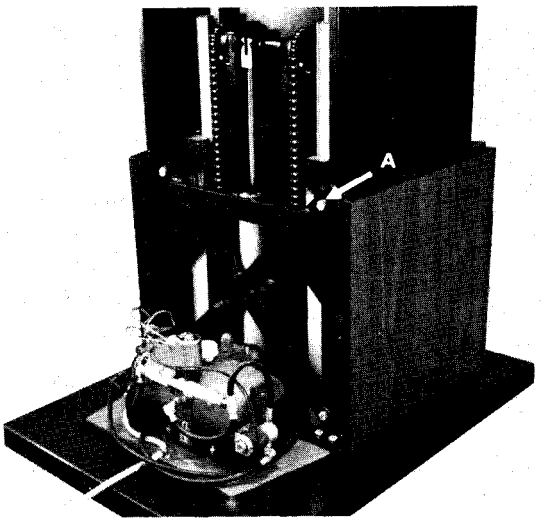

Fig. 22

3) Remove upholstered seat section. See Page 6.

4) Disconnect cord connection (Item A, Fig. 23) near the clevis of the tilt cylinder.

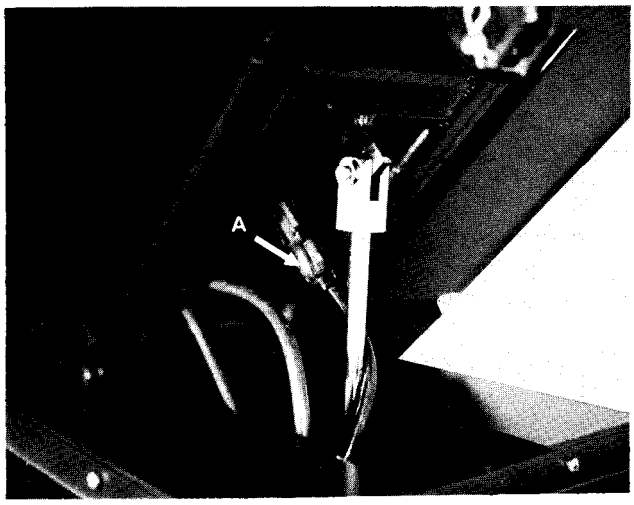

Fig. 23

5) With the back raising cylinder extended, remove cover on back of back section by removing 4 small screws (Item A, Fig. 19).

6) Remove "E" ring and clevis pin from rod end of back raising cylinder and let cylinder hang down. Have an assistant hold the back section in a vertical position as shown Fig. 24.

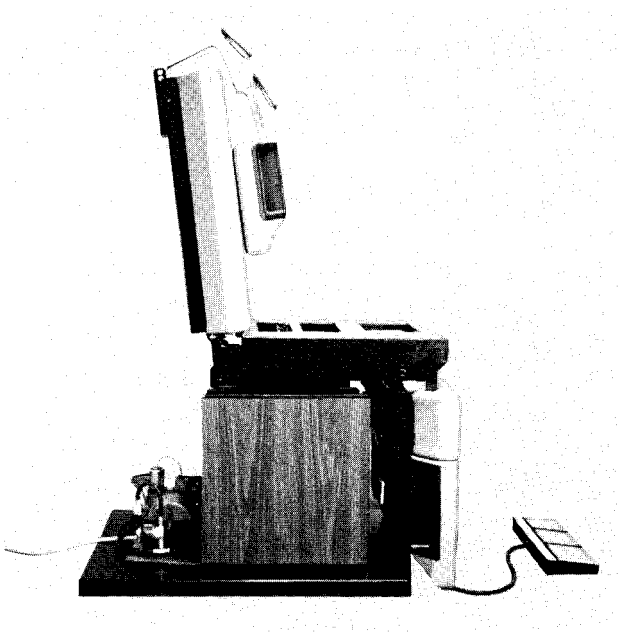

Fig. 24

7) While an assistant is holding the back section in a vertical position, remove the 6 bolts with 7/16" socket wrench (Item A, Fig. 25) from inside the seat section.

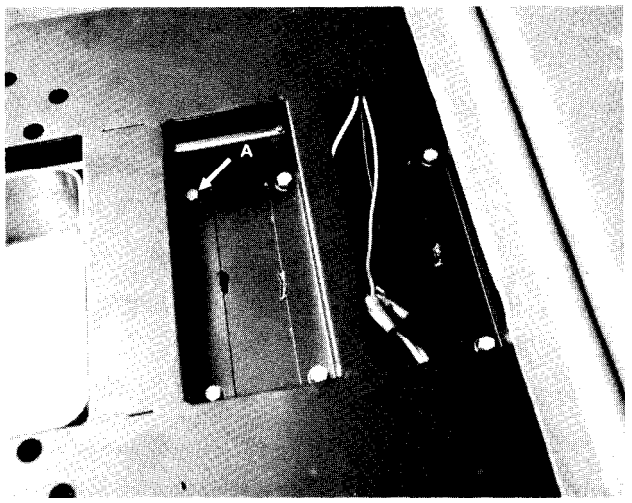

Fig. 25

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8) Lower the back section against the seat section, with protection between. (See Fig. 16). With an assistant, remove table top section from base by lifting on points A shown Fig. 26 one man each side. Set table top on floor.

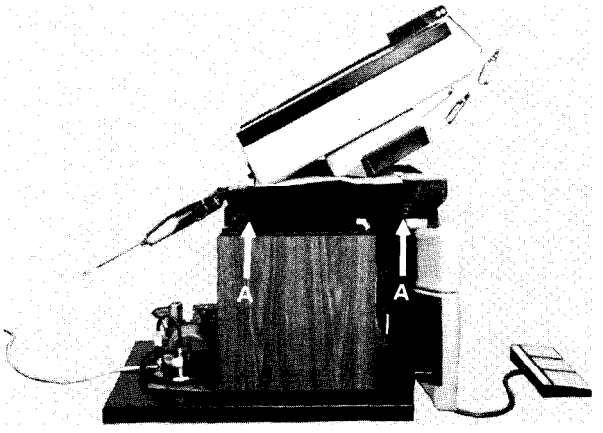

Fig. 26

Have an assistant lift on the base sliding member as shown Fig. 27 so the weight is relieved on the clevis pin and the clevis pin may be removed, then lower the sliding member slowly.

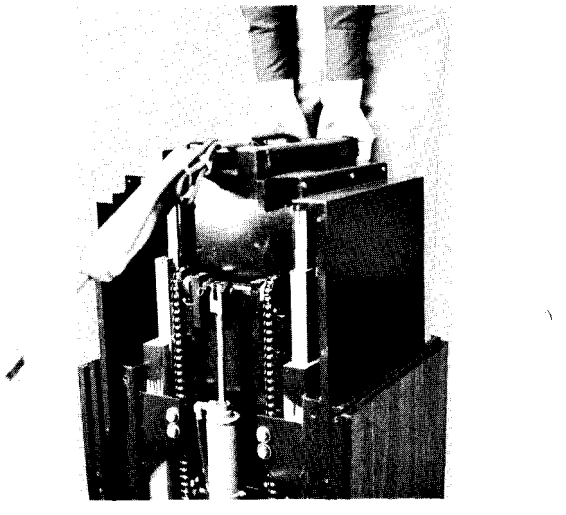

Fig. 27

10) When changing a cylinder, notice how the wires, hose fittings and nylon ties are positioned so they may be replaced in exactly the same way. (See Fig. 28.)

Remove "2" large nylon ties from defective cylinder. (Item "A", Fig. 28.)

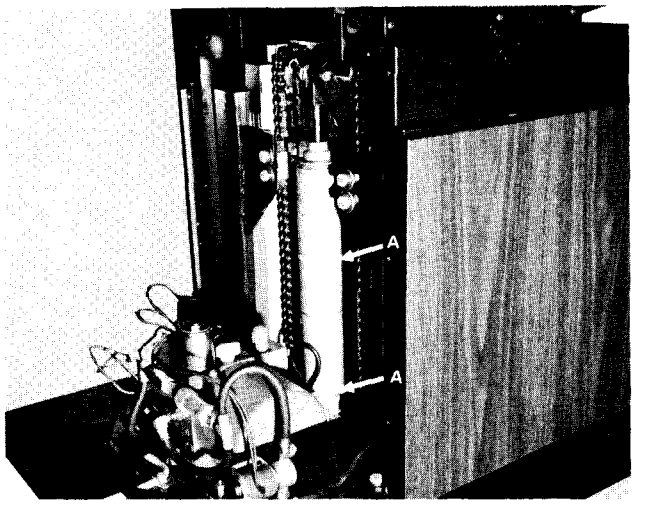

Fig. 28

12) Remove hose fittings from defective cylinder with 1/2" wrench.

13) Remove clevis pin from base end of defective cylinder and remove defective cylinder from table.

14) Place in new cylinder and install clevis pin and clip to base of cylinder.

15) Connect hose fittings to new cylinder. Notice the fitting at the base end at approximately 4.5" upward tilt.

16) Connect cord terminals to terminal board replacing defective cylinder cord white terminal to white terminal and black terminal to black. Be sure power cord is disconnected from wall outlet.

17) Have an assistant lift on the sliding member as shown Fig. 27 enabling the clevis pin (rod end) to be inserted and clip installed.

18) Install large nylon ties to cylinder, 2 places. (Item "A", Fig. 28) **Note:** Replacement ties are included in cylinder replacement kits.

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19) Connect power cord and run base cylinder all the way down and adjust for small space A (Fig. 29) above slides (approx. 1/16"-1/8", No **More).** This is done by using the wrenching flats on the cylinder rod next to the clevis with a 3/8" open end wrench. The rod will turn easiest if the rod is extended slightly.

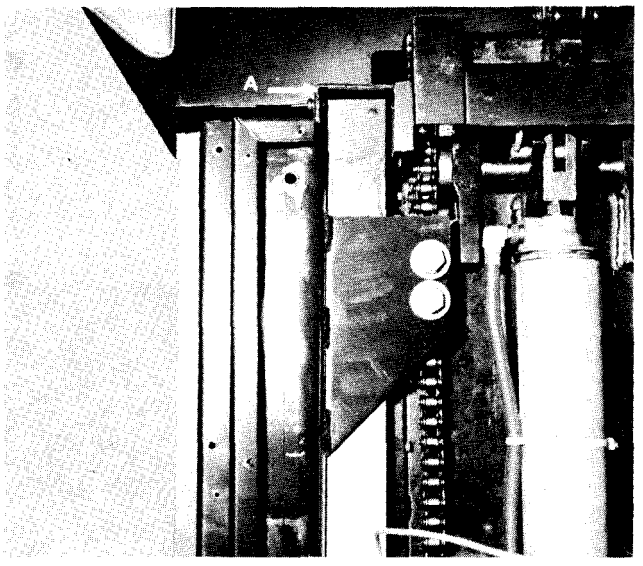

Fig. 29

20) Run cylinder several times and check fittings for leaks.

21) If leakage of hydraulic fluid was excessive, after repair oil must be added to the system. Oil should be added as noted "Adding Oil to System" Page 16.

22) With an assistant, replace table top by lifting on points A shown Fig. 26 with back section folded onto seat section as shown Fig. 26 and place on base section. Be sure hose bundle fits into slot of seat section. While seat section is resting on base section, lift back sectidn up and while holding this up, line up 6 bolt holes and attach 6 1/4-20 x 5/8" bolts with 7/16" socket wrench.

23) Connect clevis pin and "E" ring to rod end of back raising cylinder.

24) Place seat section on seat frame with metal clips toward the slots inside the seat frame. Push down firmly on seat and slide seat section toward slots to engage clips. Align front holes and install 2 #10-24 x 5/8" screws.

25) Raise tilt cylinder and connect cord connection **exactly** as shown Fig. 23. **(Note:** Cord **must** be wrapped around cylinder rod as shown).

26) Replace "X" brace with (4) 3/8" bolts as shown Fig. 22.

27) Replace shrouds and motor cover and back cover. **Note:** When replacing motor cover be sure cord fits into slot and all wires are inside motor cover.

Repair of Oil Leaks

Oil leaks can be caused by defective or damaged hose line, hose or pipe fitting, hose fitting, "0" ring or cylinder rod seal. If an oil leak appears in any area, determine exact location of leak. Remove motor cover, rear and front outer and inner shrouds. See Removal of Shrouds, Page 9. Wipe all hoses, fittings and cylinder walls dry, then run motor to determine location of leak.

Leaks at Fittings

1) If leak is located at a pipe fitting, tighten fitting a turn or two. If this does not eliminate the leak, turn the fitting out and use pipe sealer on thread. If thread is damaged, replace the fitting.

2) If leak is located at a hose fitting, tighten fitting securely. If this does not eliminate the leak, replace the "0" ring.

   To replace "0" ring, remove the hose fitting from cylinder or pump and use a small screwdriver to pry out the defective "0" ring. Position the new "0" ring and reinstall the hose fitting.

Cylinder Leaks

If a cylinder is leaking, replace the cylinder using proper procedure given on pages 10-12.

Leak at Hose Line

If a hose is leaking, remove the complete hose assembly from the cylinders and pump.

The short hose at the pump is easily replaced by removing all fittings with 1/2" wrench and reinstalling new hose.

To remove either of the long hose assemblies use the following procedure:

1) When changing hose assembly, notice the position of the hose fittings and nylon ties so they may be replaced exactly the same way. See Clamps, Figs. 16, 17 & 18.

2) Remove cover on back of back section by removing 4 small screws. (Item A, Fig. 19.)

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3) Remove "E" ring and pin from rod end of head cylinder, lay back section against seat section and let cylinder hang down. (Fig. 20.)

4) Remove the protective plastic covering. (Item B, Fig. 20.)

5) Put new hose assembly in place along side of damaged hose assembly before removing damaged hose.

6) Remove fittings and nylon ties of damaged hose, one at a time replacing with fittings of new hose and replacing nylon ties. Begin at back raising cylinder, then tilt cylinder, then base cylinder and pump. **Note:** Replacement ties are included in hose replacement kits.

Note: It' is important that all ties and clamps are replaced in exactly the same spot on the hoses, particularly the ties that attach to the spring. (See Fig. 16, 17 & 18.)

7) Remove damaged hose assembly from table.

8) Be sure all fittings and ties are tightened properly.

9) Replace protective plastic covering near back raising cylinder. (Item B, Fig. 20.)

10) Attach rod end of cylinder to back section with clevis pin and "E" ring.

11) Replace cover on back of back section with 4 small screws.

12) Run table up and down several times to purge air out of the system.

If leak was excessive, after repair, oil must be added to the system. Oil should be added as noted "Adding Oil to System", Page 16.

13) Replace shrouds and motor cover. **Note:** When replacing motor cover, be sure power cord fits into slot and all wires are inside.

Adding Oil to Hydraulic System

The hydraulic oil used in the Model 110 power system is a colorless, odorless, non-staining **light grade** of clean mineral oil. This is the same grade mineral oil as is available from any hospital stockroom or pharmacy.

The unit is filled at the factory and should never need refilling unless fluid is lost through an external leak such as a damaged hose line, fitting, or cylinder seal leak. No bleeding or purging of the hydraulic hoses is required. Any air that may reach the cylinder during shipment or during repairs will return to the reservoir after a short period of operation.

The following procedure should be followed when adding oil to the system:

1) Remove plastic motor cover. See page 9.

2) Remove plastic filler cap from top of the power pack. (Item A, Fig. 30.)

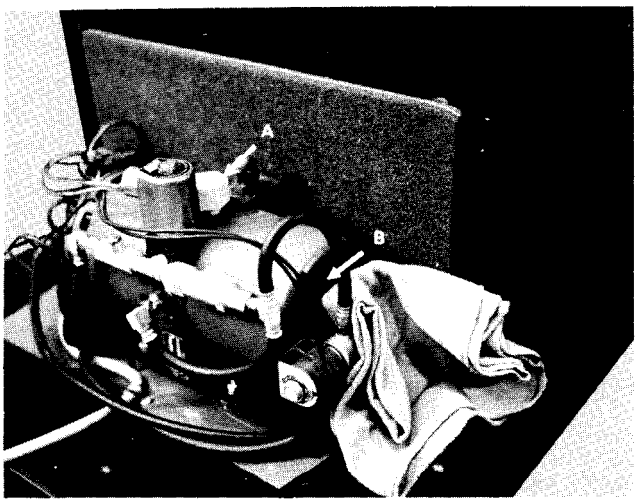

Fig. 30

3) Remove small screw from the end of tank. (Item B, Fig. 30.)

4) Place a rag at the end of tank near small screw hole Fig. 30 and fill at filler hole until oil runs out of small screw hole.

Note: Use **light grade** mineral oil.

5) Replace small screw in end of tank.

6) Replace plastic filler cap.

7) Replace motor cover. Be sure power cord fits into slot on cover and be sure all wires and hoses are inside cover.

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Lift and Stabilizing Chain Adjustment

Excessive sideways play of the table may be due to loose chains. Chain looseness will be noticed only on the lower portion of the chain loop near the idler sprockets. Adjustment may be done as follows:

1) Remove front outer shroud (stirrup end) and front inner shroud (stirrup end). See Shroud Removal Page 9.

2) With the table raised all the way up to highest position, loosen the 4 bolts (Item A, Fig. 31) with 9/16" socket wrench.

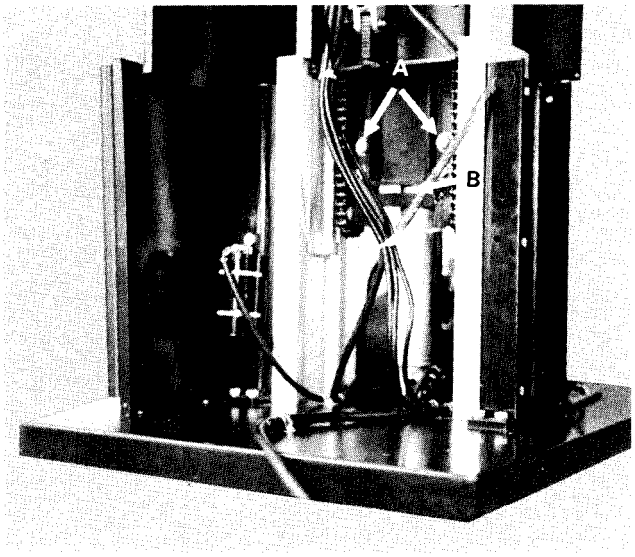

Fig. 31

3) Insert a prybar or large screwdriver in the center of slot. (Item B, Fig. 3 1.)

4) Pry up firmly and while prying up, tighten 4 bolts to hold chain in position. (Fig. 32.) The tension should be equal in both chains. The chain should not be drum tight, but with little spring back.

5) After checking chain for tightness, tighten all 4 bolts securely.

6) Replace front outer shroud and front inner shroud.

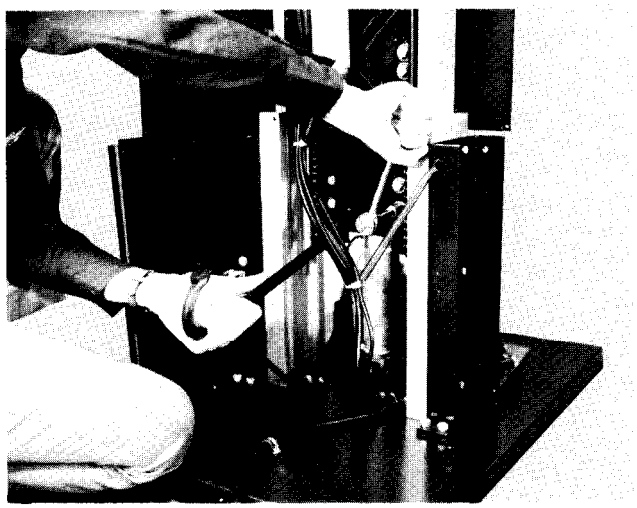

Fig. 32

Replacement or Adjustment of Foot Control Switches

If complete foot control switch must be removed from cord for any reason:

1) Remove wire cover by removing 2 screws (Item A, Fig. 35).

2) Disconnect cord by disconnecting all wire connectors shown in Fig. 33.

3) Grasp plastic bushing with pliers and while squeezing tab on bushing pull out of hole in foot switch.

Internal switches in foot control can be replaced by:

1) Removing the screw holding the foot pedal cover in place.

2) With this screw removed the foot pedal cover is then slipped off the switch housing.

3) With the pedal cover removed, remove the defective push-button switch by first removing the mounting screws from the switch and then removing the lead wires.
Note: Be sure to note position of all leads so new switch is connected properly when installed.

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If when the foot pedal is depressed the switch does not actuate, the "stops" (Item A, Fig. 34) must be adjusted down.

1) Loosen lock nut (Item B, Fig. 35).

2) Turn "stop" with allen wrench while depressing pedal until an audible "click" is heard.

3) Turn stop ½ turn after click is heard.

4) Holding stop in position with allen wrench, tighten lock nut securely.
Note : Switch may be damaged in operation if stop is turned more than ½ turn after click is heard.

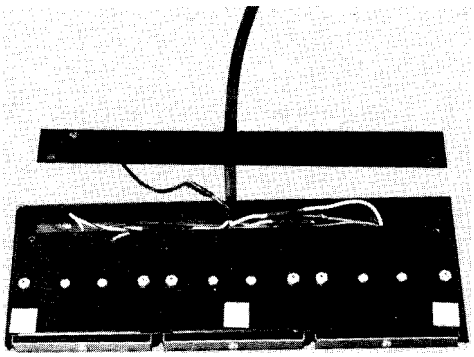

Fig. 33

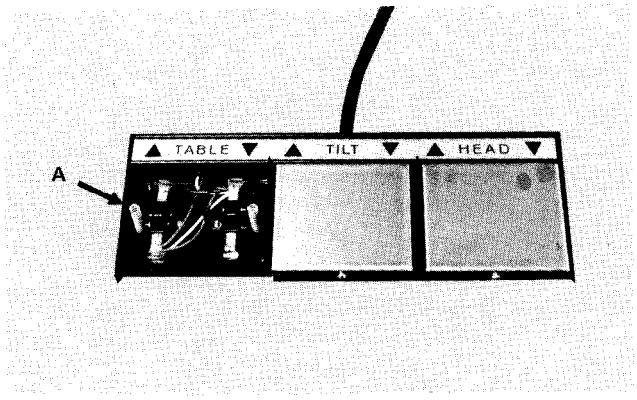

Fig. 34

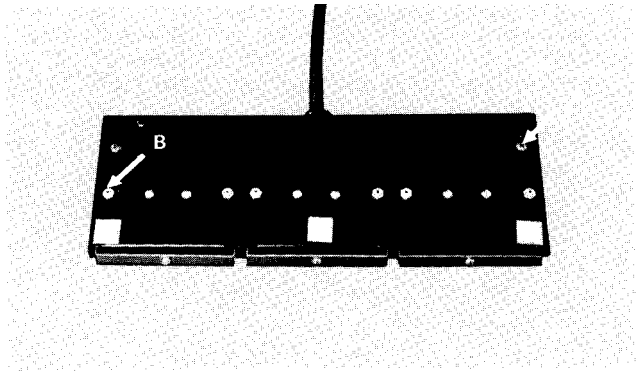

Fig. 35

Procedure for Replacing Motor Capacitor

1) Disengage power cord from wall outlet.

2) Remove front outer shroud (stirrup foot end) and front inner shroud (stirrup end). See Shroud Removal, Page 9.

3) The capacitor is located on the left hand support channel. Fig. 36.

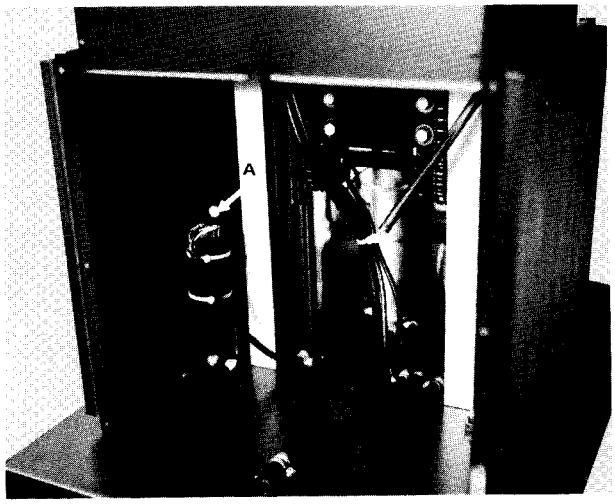

Fig. 36

4) Remove the wires from the capacitor by loosening the screws located on the top.

5) Remove the bolt Item A, Fig. 36 with 9/16" socket wrench to remove capacitor holder.

6) Remove the capacitor from the holder by pushing out the nylon ties.

7) Replace new capacitor into the holder and nylon ties.

8) Bolt capacitor holder to left hand support channel.

9) Connect wires to capacitor.

10) Replace shrouds.

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TROUBLE SHOOTING GUIDE

Many service problems are due to minor problems in the electrical circuits or control switches. Therefore when testing inoperative units, always check switches and electrical wiring first.

A wiring diagram and identification of parts page appears in the back of this manual and constant referal to these pages during trouble shooting will be necessary.

Conditions which could cause improper functioning of the power unit are listed below along with diagnosis and repair procedures.

Problem	Symptons	Probable Cause	Check	Correction
When all up and down switches are depressed individually, table will not actuate into any up or down positions.	Motor does not run, relay actuation, and no cylinder solenoid actuation (audible click).	no Unit not plugged into receptacle.	Check	Plug unit into receptacle.
		Blown fuse or faulty receptacle.	Check fuse - 15 amp. Check receptacle with test lamp.	Replace fuse if necessary. Replace receptacle if necessary
		Faulty or loose terminal on power cord.	Check power cord with test lamp.	Replace if faulty.
		Black wire of foot switch lead broken or disconnected.	Remove wire cover from underside of footswitch. See Page 17. Check connectors. lead if faulty. Check continuity of Black Wire.	Twist connector to assure good contact. Replace footswitch
	Motor does not run, but relay and cylinder solenoids actuate (audible click).	Capacitor burned out or loose terminals.	Check terminals.	Replace capacitor See Page 18.
	Motor does not run, but motor hum is audible. Relay and cylinder solenoids actuate (audible click).	Motor and pump locked. Mechanical bind or defective motor.	Allow motor to cool, then recheck.	Replace motor and pump assembly if defective.
	Motor and all electrical function properly.	Low on hydraulic oil.	Check oil level. See Page 16.	Add oil if necessary. See Page 16.
	Motor and all electrical function properly except no cylinder solenoid actuation.	Defective time delay relay.	Unplug unit from wall receptacle and bypass time delay relay by disconnecting wire from #2 terminal and attaching it to #1 terminal. Check operation, if cylinders now actuate, relay is defective.	Replace time delay relay.
When all up and down switches are depressed individually, the table will not function when base up, tilt down or head up is switch actuated. Base down, tilt up and head down functions properly.	Motor runs and cylinder solenoids actuate (audible click).	Down solenoid valve stuck in energized position.	Pressure will be apparent from pump on valve hoses at only point D, Fig. 39 when both base up or down switch is depressed. Remove solenoid and solenoid valve from pump. See Page 22 and check operation with alternate power supply. Spool inside valve body should shift when energized .	Replace solenoid valve body if faulty. See Page 22.

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Problem	Symptoms	Probable Cause	Check	Correction
(Continued)	(Continued)	Anticavitation solenoid valve solenoid burned out.	Pressure will be apparent from pump on hoses at point C, Fig. 39 when base up is depressed. Check magnetism at point E, Fig. 38. Should be slight magnetism on cap when energized.	Replace solenoid if faulty. See Page 22
	Motor does not run but cylinder solenoids actuate (audible click).	Red wire of footswitch lead broken or disconnected.	Remove wire cover from underside of footswitch. See Page 17. Check connectors. lead Check continuity of red wire.	Twist connector to assure good contact, Replace footswitch if faulty.
		Relay stuck in energized position.	Unplug unit from wall receptacle and move contactor of relay, if stuck on #5 contact break away.	File contacts with emery file or replace if faulty.
When all switches are depressed individually, table will not function when base down, tilt up or head down switch is depressed. Base up, tilt down and head up both function properly.	Motor runs, relay actuates and cylinder solenoids actuate (audible click). Pressure will be apparent from pump at point C, Fig. 39 when down or up switch is depressed.	Down solenoid burned out.	Check for magnetism at point D, Fig. 38 with base down switch depressed.	Replace solenoid if defective. See Page 22.
		Down solenoid valve stuck.	If solenoid has magnetism when energized, but problem still exists remove solenoid and solenoid valve from pump. See Page and check operation with alternate power supply. Spool inside valve body should shift when solenoid is energized.	Replace solenoid valve body if defective See Page 22 .
	Same as above but pressure will be apparent at point D, Fig. 39 for base down and at point C, Fig. 39 for base up.	Adjustable flow control may be closed.	Loosen lock nut, turn screw counter clockwise and recheck.	Set down time for base at 12 seconds
	Motor does not run. Relay does not actuate but cylinder solenoids actuate (audible click).	Blue wire of footswitch lead broken or disconnected.	Remove wire cover from underside of footswitch. See Page 17. Check connector. lead Check continuity.	Twist connector tc assure good control Replace footswitch if no continuity.
		Relay stuck in unenergized position.	Unplug unit from wall receptacle and move contactor of relay if stuck on #6 contact, break away.	File contacts with emery file or replace relay if faulty.
		Relay solenoid burned out.	Remove relay and check with alternate power supply.	Replace if faulty.

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Problem	Symptoms	Probable Cause	Check	Correction
When all switches are depressed individually, base up and base down does not function. All other actions function.	Motor runs but base cylinder solenoid does not actuate (no audible click).	White wire from footswitch lead is broken or disconnected.	Remove wire cover from underside of footswitch. See Page 17. Check connector and check continuity of white wire.	Twist connector to assure good contact. Replace footswitch lead if faulty.
		Cylinder solenoid burned out.	If above checks O.K.	Replace base cylinder. See Page 12.
Base up functions but not base down or base down functions but not base up. All other actions function.	Motor does not run and no base solenoid actuation (no audible click).	Footswitch out of adjustment.	See Page 17.	Adjust if necessary.
	Motor may or may not run and cylinder solenoid may or may not actuate.	Defective micro switch in footswitch control.	Check continuity of micro switch in on and off positions see Page 17 and wiring diagram.	Replace micro switch if continuity does not conform to wiring diagram.
When all switches are depressed individually, tilt up and tilt down does not function. All other actions function.	Motor runs but tilt cylinder solenoid does not actuate (no audible click).	Orange wire from footswitch lead is broken or disconnected.	Remove wire cover from underside of footswitch. See Page 17. Check connector and check continuity of orange wire.	Twist connector to assure good contact. Replace footswitch lead if faulty.
		Cylinder solenoid burned out.	If above checks O.K.	Replace tilt cylinder. See Page 12.
Tilt up functions but not tilt down or tilt down functions but not tilt up. All other actions function.	Motor does not run and no tilt solenoid actuation (no audible click).	Footswitch out of adjustment.	See Page 17.	Adjust if necessary.
	Motor may or may not run and cylinder solenoid may or may not actuate.	Defective micro switch in footswitch control.	Check continuity of micro switch in on and off positions. See Page 17 and wiring diagram.	Replace micro switch if continuity does not conform to wiring diagram.
When all switches are depressed individually, head up and head down does not function. All other actions function.	Motor runs but head cylinder solenoid does not actuate (no audible click).	White with black stripe wire from footswitch lead is broken or disconnected.	Remove wire cover from underside of footswitch. See Page 17. Check connector and check continuity of white with black stripe wire.	Twist connector to assure good contact. Replace footswitch lead if faulty.
		Cylinder solenoid burned out.	If above checks OK.	Replace head cylinder. See Page 10.
Head up functions but not head down or head down functions but not head up. All other actions function.	Motor does not run and no head solenoid actuation. (no audible click).	Footswitch out of adjustment.	See Page 17.	Adjust if necessary.
	Motor may or may not run and cylinder solenoid may or may not actuate.	Defective micro switch in footswitch control.	Check continuity of micro switch in on and off positions. See Page 17 and Wiring Diagram.	Replace micro switch if continuity does not conform to wiring diagram.

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Problem	Symptoms	Probable Cause	Check	Correction
Either base, tilt or head cylinder will not hold position. May drift down slowly.	Motor and all electrical functions properly.	Faulty micro switch in footswitch control. May be holding cylinder solenoid in energized position.	Check for current with test lamp at cylinder terminal with switch in off position. Check both up and down switches. See Page 17 and see wiring diagram.	If there is current at cylinder terminal with switch in off position, replace micro switch.
		Dirt particle in cylinder solenoid valve or faulty cylinder solenoid.	Flush dirt particle to reservoir by running cylinder in and out about 10 times if this does not help, a replacement cylinder will be needed.	Replace cylinder. See Pages 10 thru 12.
Head may be lifted or tilt may drift up with weight on the back section.		Defective anticavitation solenoid valve.	Lift on back section, if it raises with hand pressure, anticavitation valve is defective.	Replace anticavitation valve body. See Page 22.
Excessive sideways play of table base.		Loose stabilizing chains.	Check chains for tightness.	Tighten chains. See Page 17.

Removal Of Down Solenoid

The solenoid may be removed by removing the nut on top of the valve then pull the solenoid up. The valve body may be removed by turning the large hex until the valve is free then carefully pull up. **(See** Fig. 37.)

Removal Of Anticavitation Solenoid

The solenoid may be removed by prying off the small cap on the end of valve with a screwdriver then push the valve stem out of the solenoid to free the solenoid. The valve body may be removed by removing the hose fittings. (See Fig. 37.)

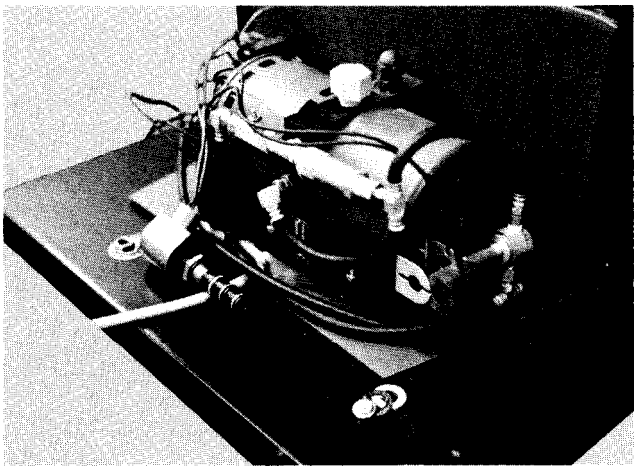

Fig. 37

Power System Parts Identification

Internal relief valve: Regulates the fluid pressure for cylinder extension (up stroke). This is set at the factory for 600 p.s.i. and should never be tampered with. (Item A, Fig. 38.)

Relief check valve: Regulates the fluid pressure for cylinder retraction (down stroke). Fixed at 200 p.s.i. (Item B, Fig. 38.)

Adjustable flow control: Regulates the speed of cylinder retraction. Set for 12 seconds base down time. (Item C, Fig. 38.)

Down solenoid valve: Reverses the flow of fluid for cylinder retraction (down stroke). (Item D, Fig. 38.)

Anticavitation solenoid valve: Locks cylinders against extension when unenergized. Prevents tilt from raising when weight is put on the back section. (Item E, Fig. 38.)

Time Delay Relay: Delays opening of cylinder solenoids for 1/10 second to avoid momentary drop in up actuations. (Item E, Fig. 39).

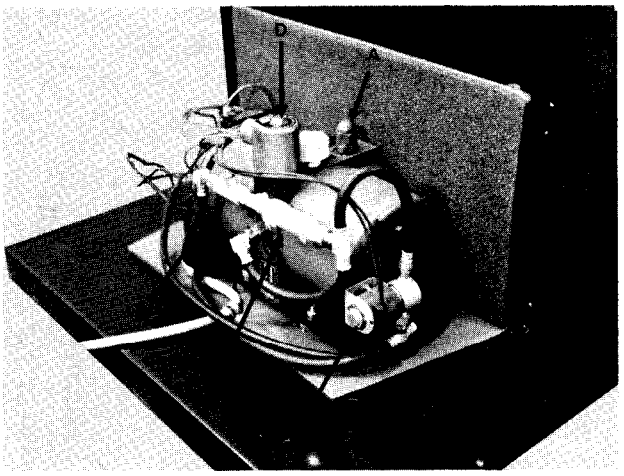

Fig. 38

Relay: Actuates only for cylinder retraction (down stroke). (Item A, Fig. 39.)

Terminal board: Termination for wires. Item B, Fig. 39.

Pressure line for cylinder extension and return line for cylinder retraction. (Point C, Fig. 39.)

Return line for cylinder extension and pressure line for cylinder retraction. (Point D, Fig. 39).

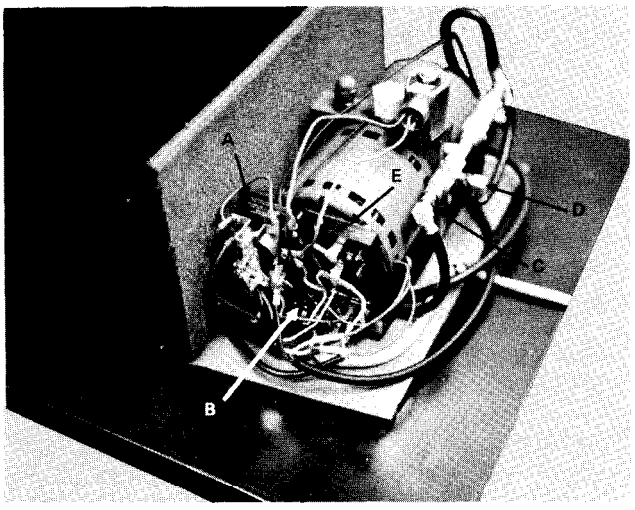

Fig. 39

Base Cylinder Kit	002-0001-00
Tilt Cylinder Kit	002-0002-00
Head Cylinder Kit	002-0003-00
Power Hose Kit	002-0004-00
Return Hose Kit	002-0005-00
Switch Wire Kit	002-0006-00
Fitting Kit	002-0007-00
"0" Ring	014-0021-00
Motor Pump Assembly	014-0035-00
Pump Hose	014-0036-00
Solenoid - Down Solenoid Valve	0 14-0040-00
Valve Body - Down Solenoid Valve	014-0041-00
Anticavitation Solenoid Valve	0 14-0044-00
Relay	01 S-0023-00
Capacitor	015-0024-00
Micro Switch	015-0045-00
Switch Lead Cord	015-0049-00
Time Delay Relay	015-0061-00

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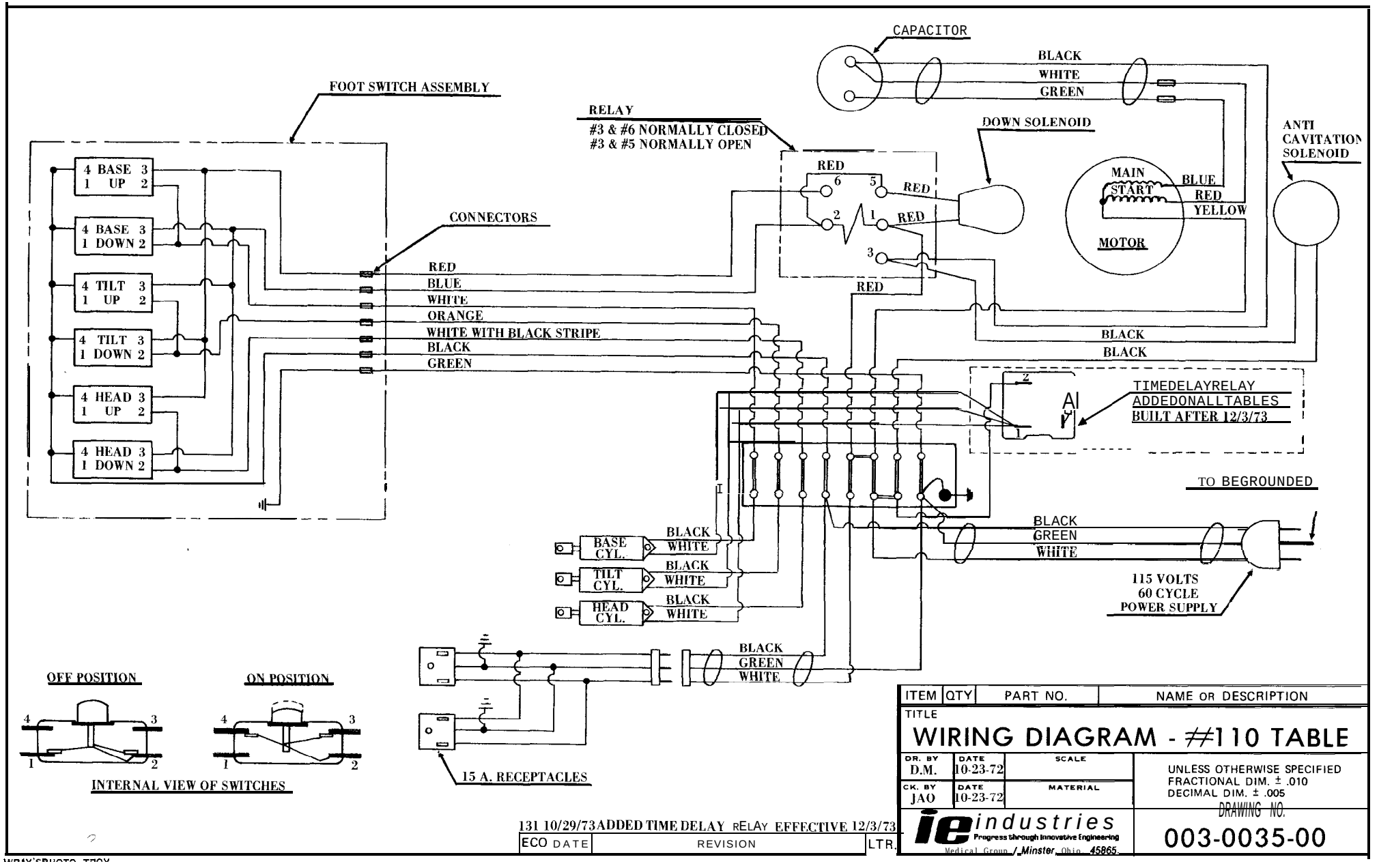

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FAX ORDERING FORM

(SERVICE PARTS ONLY)

NOTES:

- **ALL BLOCKED AREAS MUST BE COMPLETED.**
- **USE FOR NON-WARRANTY FAX ORDERS ONLY. WARRANTY ORDERS MUST BE TELEPHONED IN (1-800-MIDMARK).**

ATTENTION: SERVICE DEPARTMENT FAX#: 877-249-1793

ACCT #: _____ **P.O. #:** _____ **DATE:** _____

NAME: _____ **SHIP TO:** _____

ADDRESS: _____

CITY, ST.: _____

CONTACT: _____

PHONE: _____

☐ **NON-EMERGENCY ORDER - TO SHIP WITHIN 72 HOURS IF PART(S) IN STOCK.**

☐ **EMERGENCY ORDER - TO SHIP WITHIN 24 HOURS IF PART(S) IN STOCK (IF ORDER IS RECEIVED BEFORE 1:30 P.M. E.S.T).**

SEND NOTIFICATION IF PARTS ARE NOT AVAILABLE TO SHIP WITHIN 24 HOURS VIA E-MAIL OR FAX TO: _____

METHOD OF SHIPMENT **OTHER** _____

UPS	FED EX
☐ NEXT DAY A.M.	☐ NEXT DAY A.M.
☐ NEXT DAY P.M.	☐ NEXT DAY P.M.
☐ 2ND DAY	☐ 2ND DAY
☐ GROUND	☐ ECONOMY

QTY.	PART #	DESCRIPTION (SPECIFY COLOR OF ITEM IF APPLICABLE)	COLOR CODE	PRICE/PER

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